

REMARKS/ARGUMENTS

Favorable reconsideration of the present application, in light of the included amendments and following discussion, is respectfully requested.

Claims 42-82 are pending. Claims 62-82 are withdrawn. Claims 62 and 63 are amended. Support for the amendments to Claims 62 and 63 is self-evident. No new matter is added. Claims 56, 60, and 61 were indicated as reciting allowable subject matter. Applicants note with appreciation the indication that Claims 56, 60, and 61 recite allowable subject matter.

In the outstanding Office Action, the objection for lack of unity was made Final. Claims 42-49 were rejected under 35 U.S.C. §103(a) as obvious over Droin (U.S. Patent No. 4,071,083) in view of Takayasu (U.S. Patent No. 5,874,178). Claim 50 was rejected under 35 U.S.C. §103(a) as obvious over Droin, Takayasu, and Laber (U.S. Patent No. 4,182,408). Claims 51-55 and 57-59 were rejected under 35 U.S.C. §103(a) as obvious over Droin, Takayasu, and Menicatti et al. (U.S. Patent No. 4,899,813, herein "Menicatti").

Regarding the rejection of Claim 42 as obvious over Droin in view of Takayasu, that rejection is respectfully traversed by the present response.

Independent Claim 42 recites, in part:

an external layer configured to tolerate a predetermined pressure load, subject to corrosion by contact with the highly aggressive process fluid;

an intermediate layer made of stainless steel; and

an anticorrosive lining in contact with the highly corrosive fluid, including a material selected from titanium, zirconium, or an alloy of one of these.

Accordingly, the apparatus includes an external layer configured to tolerate a predetermined pressure load and an intermediate **layer** made of stainless steel.

In contrast, Droin and Takayasu both fail to disclose an external layer, intermediate layer, and anticorrosive lining as recited in independent Claim 42.

Droin describes an ordinary combination of elements, commonly used in the construction of exchangers or stripper in contact with corrosive liquids, such as ammonium carbamate solutions in the process of synthesis of urea (see column 2, lines 10-18). In particular, Droin describes the area of insertion of the tubes in the tube plate, wherein a "ferritic steel" tube (2), which end is formed of an "austenitic stainless steel" ferrule (3), is inserted in the tube plate constituted of a thick layer (5) of common "carbon steel" covered by an "austenitic stainless steel" layer (6).

Regarding the statement in outstanding Office Action referring to Droin as describing a stainless layer (6) provided on ferritic supporting layer (5), layer (5) is a carbon steel layer whereas "ferritic steel" refers to tube (2).¹

Takayasu describes a particular multilayer material, wherein (see Figure 1) a thick carbon steel substrate (1) is linked to a protective lining (4) formed of Ti or Zr, through a **mechanical** connection provided by a metal mesh, eventually supported by a welding layer based on Ni. As discussed from col. 3, lines 10-26, Takayasu describes the intrusion of the "metal mesh" in the lining (4) on the one hand, and the substrate (1) (directly or through metal bonding with Ni) on the other.

The solution found by Takayasu to the problem of adhesion between two metallic layers which cannot be welded to each other (Ti or Zr, vs. Carbon Steel) is that of using a metal "mesh" which mechanically bonds the layers by "intrusion" therein. This solution would not address the problem of containing corrosion in the event the Ti or Zr covering ruptured. In fact, in that case, the corrosive liquid would be in no way obstructed by the "metal mesh" of Takayasu and would immediately contact the carbon steel substrate or the

¹ Droin, col. 2, lines 31-32 and 43-44.

in-between Ni layer, causing severe corrosion. This is specifically one of the problems to be addressed by the apparatus recited in Claim 42. see page 9, lines 8-18 of the specification.

In view of the above, it is clear that the "metal **mesh**" suggested by Takayasu does not correlate to the stainless steel "metal **layer**" of the type used as an "intermediate layer" according to Claim 42. In fact, also according to a general definition, a metal mesh would not be considered as a metal layer by a person of ordinary skill in the art because the concept of "layer" involves continuity of the same. Therefore, Takayasu does not provide a suggestion how to provide a tube bundle exchanger provided of a multilayer wall with high resistance to corrosion and high standard of safety, as recited in Claim 42.

Accordingly, Applicants respectfully submit that independent Claim 42 patentably distinguishes over any proper combination of Droin and Takayasu for at least the reasons discussed above.

Each of the remaining active independent claims depends from independent Claim 42 and patentably distinguishes over any proper combination of Droin and Takayasu for at least the reasons discussed above with respect to independent Claim 42.

The outstanding Office Action relies on Laber for the feature of weep holes and Menicatti for the feature of multi-layered tubes. However, neither Laber nor Menicatti remedies the deficiencies discussed above with regard to Droin and Takayasu in relation to independent Claim 42. Laber is devoid of a stainless layer. Menicatti describes a stainless steel tube with an inner liner, i.e., the stainless steel is not in intermediate layer, but is instead an outermost layer. Accordingly, Applicants respectfully submit that Claims 50-55 and 57-59 patentably distinguish over any proper combination of the cited references.

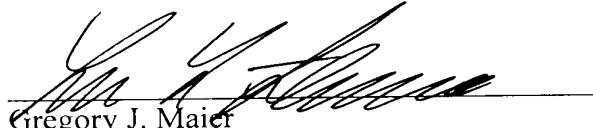
Applicants respectfully note that Claims 62-82 recite all of the features of independent Claim 42 by reference. For example, independent Claim 64 recites "a method for manufacturing a tube bundle apparatus according to claim 42." Accordingly, Applicants

respectfully request that Claim 64 and the claims depending therefrom be examined along with Claims 42-61. Additionally, amended Claim 62 recites "a plant configured for synthesis of urea comprising the apparatus of claim 42." Accordingly, Applicants respectfully request that Claims 62 and 63 depending therefrom be examined along with Claims 42-61.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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